Ultimate Nano-Processing Laboratory

School of Systems Engineering / Graduate School of Engineering
Kochi University of Technology

Prof. Eiichi Inami (Dr. Eng.)

E-mail : inami.eiichi@kochi-tech.ac.jp

185 Miyanokuchi, Tosayamada, Kami, Kochi 782-8502, JAPAN

Research Areas:
 Surface science, Condensed-matter physics, Nanomaterial, Nanostructure physics, Scanning probe microscopy (SPM), Atom/molecule manipulation

Research Overview:

Our research centers on advanced materials processing at an extremely tiny scale. To achieve this, we primarily use scanning probe microscopies (SPM), including scanning tunneling microscopy (STM) and atomic force microscopy (AFM), to characterize material surface properties from the nanometer to atomic scale and to manipulate individual atoms and molecules. Through these studies, we are trying to unveil new functionalities within nanostructures and systematically integrate them into specific nanoscale regions. This facilitates innovative nano-fabrication and the creation of atomic-scale integrated devices based on new principles.
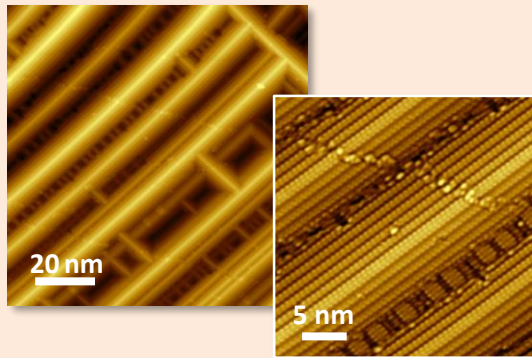
Scanning Probe Microscopy (SPM)

probe

imaging

surface

manipulation

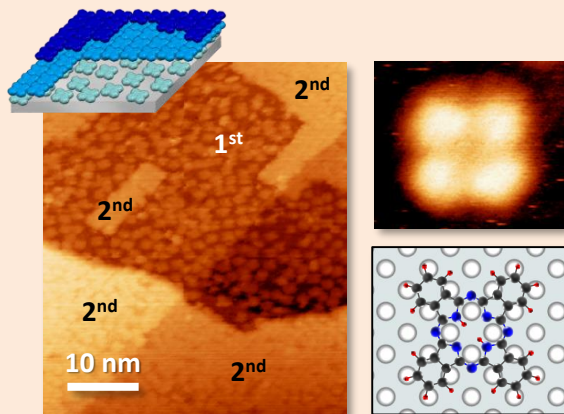single atom
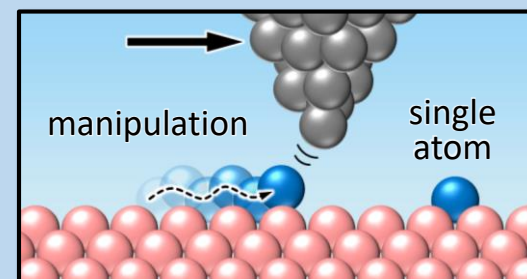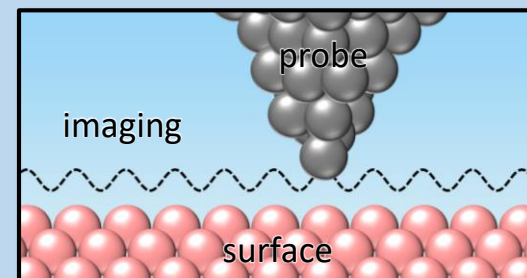
Research Topics

Research subjects can be classified into three main categories.

Characterization
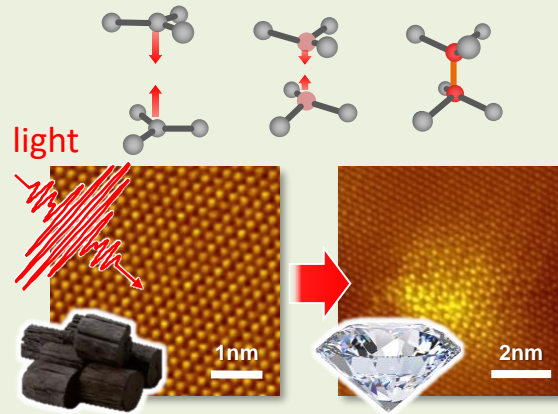
Nano-to-atomic level analysis of material surfaces
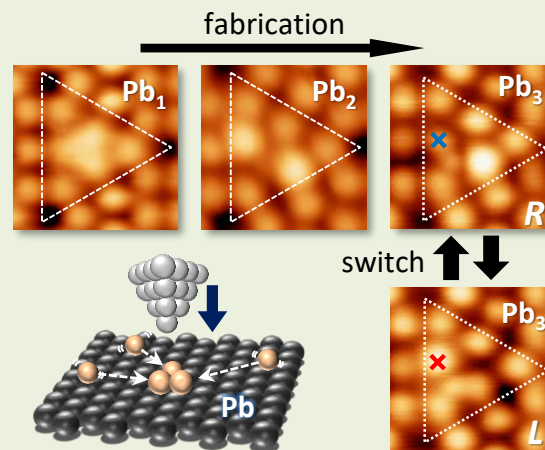

Lattice work structure on rutile TiO_2 surface

Robust molecular film at room temperature

Nanofabrication

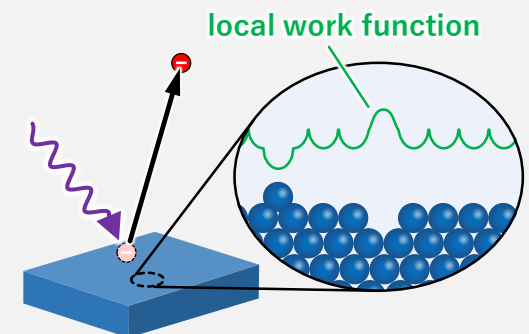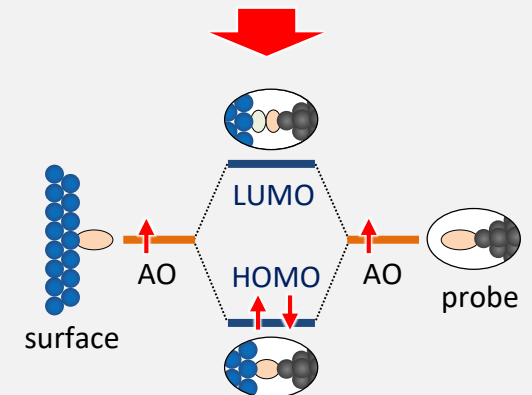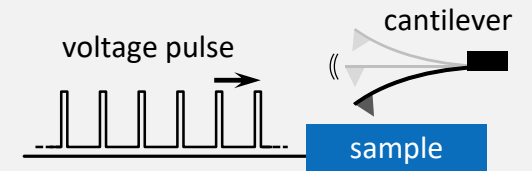**Atomic-level control of material structures**

Photoinduced structural phase transition

Fabrication and control atom switch

Advanced Microscopy

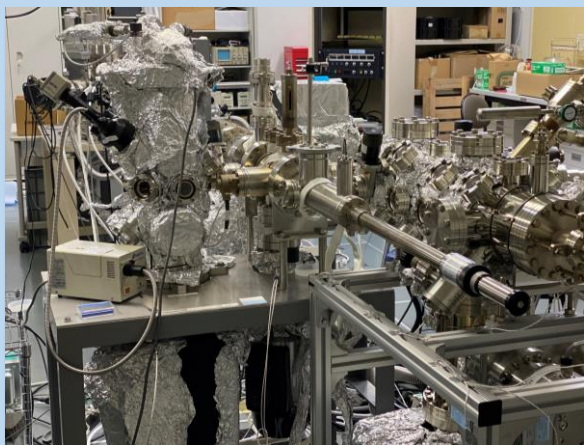**Development of atomic-Level analysis techniques**

Pulse scanning probe microscopy
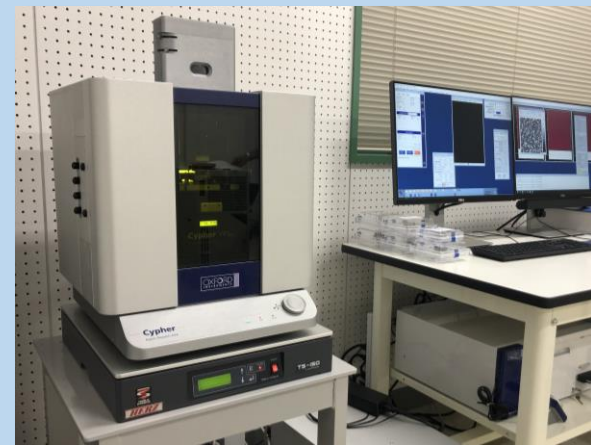
Primary research instruments

Ultra-High Vacuum STM
(UNISOKU, USM901)

Low Temperature Ultrahigh Vacuum STM
(UNISOKU, USM1200)

High-Resolution, Video-Rate AFM
(Oxford Instruments, Cypher VRS)

∗ Shared Instrument

Expected Performance

The successful candidate would be expected to:

- Make a research plan and define the research term to achieve the purpose.
- Work independently in experimental preparation, work, and data analysis.
- Work actively and cooperatively (including communication skills) with Lab members.

Required Skills and Knowledge

The successful candidate would be expected to have:

- Basic knowledge of quantum mechanics, condensed matter physics, and surface science.
- Knowledge and skills in operating ultra-high vacuum (UHV) systems, scanning tunneling microscopy (STM), and atomic force microscopy (AFM).
- Knowledge of LabVIEW and programming skills (C++, python, etc.).